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International Exhibition of 1876.

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Medical Staff of the United States Army,

AND

ITS SCIENTIFIC WORK.

AN ADDRESS

DELIVERED TO THE INTERNATIONAL MEDICAL CONGRESS
AT PHILADELPHIA,

WEDNESDAY EVENING, SEPTEMBER 6, 1876.

BY

SURGEON J. J. WOODWARD, U. S. ARMY,

IN CHARGE OF THE REPRESENTATION OF THE MEDICAL DEPARTMENT, U. S. A.



Philadelphia, 1876.

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THE MEDICAL STAFF OF THE UNITED STATES ARMY, AND ITS SCIENTIFIC WORK.

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BY

SURGEON J. J. WOODWARD, U. S. ARMY.

GENTLEMEN :

The Centennial Medical Commission having requested the Surgeon General of the Army to depute an officer of the Medical Staff to occupy an evening during the session of the International Medical Congress by giving some account of the scientific work of the Medical Department of the Army, the Surgeon General has designated me as the officer to undertake the task, and, in obedience to his commands, I am here to-night to comply with the invitation of the Commission.

In the discharge of this duty, I wish first of all to explain, as briefly as possible, how it happens that a certain class of scientific work, intimately connected in its nature and results with the progress of practical medicine and surgery, is undertaken by the Medical Bureau, and I hope to make it clear to you that the kind of work to which I refer is of national importance, and that it can be better and more economically done by the Medical Bureau of the Army than in any other way. I shall, then, endeavor to lay before you in a sketchy way, for a single evening will not suffice to go into any branch of my subject in detail, the character of the work already done, and of that actually in progress, with some hints as to matters which might profitably be undertaken in the future, did the means placed at our disposal permit.

It is the duty of the Surgeon General to provide for the maintenance of the health of the Army, as well as for the humane treatment of its sick and wounded. The first duty is, if possible, more important and

more delicate than the second, and both are rendered much more difficult to discharge efficiently than might be anticipated, in view of the small number of men in our little army, by the comparatively great number of separate military posts, and by the vast extent of the territory over which they are scattered.

The total strength of the Army, officers and men, is after all less than twenty-eight thousand, hardly the strength of an army corps of the army of the great German Empire, but it is broken up into little detachments, so that there are nearly two hundred permanent garrisoned posts, and almost half as many more detached parties, of variable strength, requiring medical care. I think it quite safe to affirm that the actual strength of the army might be increased ten-fold without materially increasing the labor of its medical administration, provided the number of posts and detachments remained the same as now.

These posts and detachments are scattered over all parts of our wide territory. They are most numerous in the great interior wilderness, remote from the comforts and facilities of more settled communities. Many of them on the southern coast and the Mexican frontier are exposed to frequent visits of epidemic yellow fever, the scourge of our southern seaboard, which, as late as 1867, destroyed in a single season nearly one per cent. of the whole strength of the army of that year. Moreover, the troops stationed on the Indian frontier are most of the time exposed to all the hardships and privations of a state of actual war. I know that a great statesman has recently declared that Indian conflicts are not war, and that it has been decided that gallantry in these bloody struggles shall no longer receive the poor reward of brevet rank : but the bullet wounds that are received are none the less dangerous because they are inflicted by a savage foe, and the privations and hardships of campaigns in the wilderness against a well-armed enemy who greatly out-numbers our little force, have precisely the same tendency to produce disease and death that the same conditions would exert could they exist in a war against a civilized foe. In a recent disaster, which is only too fresh in the memory of my hearers, about one per cent. of the whole strength of the army, among them two medical officers,* perished in a single day. Let us hope that such a catastrophe may never occur again ; but similar incidents, though the total loss in each case was less, have happened before, and almost every year since the close of the civil war has had its share of victims fallen in obscure but bloody conflicts.

Now, it is self-evident that the officer charged with the medical and surgical care of any army must keep himself informed as to its sanitary

* Assistant Surgeon George E. Lord, U. S. Army, and Acting Assistant Surgeon James M. De Wolf.

condition : as to the number and character of the cases of disease actually occurring, and the circumstances under which they are developed ; as to the number and character of the wounds, and the circumstances under which they are sustained. This information would be indispensable to the intelligent action of the Surgeon General of the Army, even were he charged with no other duties than the assignment of the medical officers and the purchase and distribution of the medical supplies required for the treatment of the sick and wounded ; it is still more necessary if he is expected to supervise the sanitary condition of the army with a view to the suppression, as far as possible, of all preventable diseases. In the army of every civilized nation in modern times, therefore, the medical officers actually serving with troops are required to keep a record of the cases of sickness and wounds under their care, and to report them at stated intervals to a central bureau. It is, furthermore, self-evident, that if these reports are at all numerous or voluminous, as they must be, either if the army is large or if it is scattered in numerous detachments, the Surgeon General will be physically unable to perform the task of personally examining them with any thoroughness, and must assign this duty to others, distributing it among a sufficient number of competent assistants, who must analyze the reports received, and bring to the attention of the Surgeon General such facts and deductions as require his official action. In other words, the Surgeon General of an army, to act efficiently, requires a personal staff of medical officers who enjoy his confidence, and who must be competent to analyze thoroughly the various reports assigned to them, and, if necessary, to advise intelligently on any matters as to which their opinions may be required by their chief.

In our own army, the system of reports established for the purposes just indicated is briefly as follows :

The medical officer of each post or station is required to keep a register of the sick and wounded under his care, in which each patient is entered by name, with the date at which he is taken on sick report ; the diagnosis of his disease or injury, and the termination of the case, being subsequently entered in appropriate columns. From this register a monthly report of sick and wounded is prepared, and forwarded to the Surgeon General from each post or station. It contains a statistical statement of the number of cases of each kind of disease or injury under treatment at the commencement of the month, the number taken on sick report during the month, and the number of each recovered, died, discharged the service, or otherwise disposed of, and the number remaining under treatment at the close of the month. The report also includes a list of the deaths and discharges from the service on surgeon's certificate of

disability, giving in each case the name of the soldier and the cause of death or discharge, and has a place reserved for any necessary explanatory remarks.

These reports, consolidated and analyzed at the Surgeon General's Office, keep the Surgeon General constantly informed as to the health of each individual post, of each military department, and of the whole army; acquainting him with the actual amount of sickness, its nature, mortality, and relationship to strength, with the number of wounds and injuries, their character, mortality, and the localities at which they have occurred. The deaths and discharges for disability are recorded in alphabetical registers for convenient reference, and subsequently serve to give necessary information to the accounting officers of the Government, and especially to the Commissioner of Pensions, in case discharged soldiers, or the heirs of the deceased, make application for pensions or other allowances due under the laws of the land. The medical officer of each post or station is required, besides, to make special reports of interesting cases, giving the full histories of such as appear to him of sufficient importance, and in case of the outbreak of epidemic diseases, giving monthly, besides the usual statistical report, a list of all the soldiers attacked, with the date of attack and the date of recovery or death. In such epidemic outbreaks the medical officer is required to investigate the cause of the outbreak, to ascertain, if possible, the mode of introduction, if the disease is introduced from without, and to record the circumstances under which it has originated if it appears to have resulted from local causes. These investigations serve as the basis of a special report, which is required of the medical officer in charge of any post or detachment in which an epidemic outbreak may occur.

As intimately connected with the question of the causes of disease, the medical officer in charge of each post is required to keep a meteorological register, a transcript of which must be furnished to the Surgeon General at the close of each month. Moreover, at the close of each year the medical officer of each post is required to make to the Surgeon General a general sanitary report on the health of the post, with remarks on the diseases which may have prevailed, and suggestions, if any occur to him, as to the improvements or changes which in his opinion may be advantageously introduced, with the view of improving the health of the garrison.

Injuries, wounds, and surgical operations are made the subject of separate special reports, giving the names of the soldiers, and the particulars of each case.

Medical officers examining recruits are obliged to record the name and physical description of each recruit examined, and in the case of

rejected recruits, the cause of rejection. A transcript of this record is furnished to the Surgeon General at the close of each month.

Now, I think, it will be understood without argument, that such a mass of reports as I have just indicated, embracing annually the observations and experience of several hundred well-educated medical men, stationed at as many different places, must contain a great deal of information which, besides its administrative value, must have no little significance in connection with the interests of progress in scientific medicine and surgery. I wish, on the one hand, to insist that all these reports are indispensable from the mere administrative point of view. Without them, and especially, I may add, without their intelligent analysis, the Surgeon General of the Army, whatever his personal ability, would be but a figure-head, powerless for any efficient interference in behalf of the health of the army. On the other hand, I wish also to insist on the fact, that by a very small additional expenditure of labor, clerical force, and money, beyond what would be indispensable for the intelligent administrative use of the facts collected, they can be made to subserve a much wider purpose, and the usefulness of the work, which is indispensable to the army itself, for the sake of which primarily it is done, can be vastly extended so as to benefit the medical profession at large, and, through the medical profession, the sick and injured in every walk of life.

These considerations would afford a sufficient motive for much of the scientific work that has been done by the Medical Bureau in the past, and for much that is still in progress; but there are other circumstances to be considered of equal, indeed, as I think, of even greater significance.

A few years ago our country was convulsed by a great civil war which lasted for four long years. During this time about a million of men were constantly under arms in defence of the national flag; about two hundred thousand of them died of disease, about one hundred thousand of wounds. The Confederate armies, though somewhat smaller, were numerous enough to resist effectively till the very close of the struggle. Their losses can hardly have been much less than those of the national armies. After the close of the war the national armaments were disbanded; the great general hospitals, several hundred of which were in operation, were closed as rapidly as the patients under treatment could be provided for, and it became necessary, for administrative reasons, to order that as each was closed its books and records should be sent to the Surgeon General's Office in Washington. In that office there had also accumulated during the war a vast quantity of reports of sick and wounded, and other records which had been required for administrative purposes during the war. The records thus accumulated embraced over sixteen thousand folio volumes of manuscript record books,

and, I suppose, several tons of manuscript reports and papers. Urgent administrative reasons demanded that these records should be examined, classified for convenient reference, and, to a certain extent, that their contents should be analyzed. The pension laws of the United States are so framed that it became necessary, in almost every one of the hundreds of thousands of applications for pensions, to apply to the Surgeon General for the hospital history of the soldier concerned. Subsequently, liberal laws were adopted granting artificial limbs and other prosthetic apparatus to those who had lost limbs or been otherwise mutilated, and trusses to those who had been ruptured during the war. This bounty was to be dispensed under the direction of the Surgeon General, and again the records of his office came into requisition, both to protect the Government against fraudulent claims and to secure the rights of honest applicants. For all these strictly administrative purposes a vast amount of clerical work became necessary, and that this work might effect its end, it was absolutely necessary that it should be directed at every step by competent medical officers.

Now, it became evident from the very first, that by the expenditure of a comparatively small amount of additional labor in the supervision of this work, by a comparatively small increase of the clerical force, and other expenditures absolutely required for mere administrative reasons, results might be attained the publication of which would be beneficial to mankind, and it seemed as though it would have been indeed a great national crime to have lost this opportunity to utilize, in the service of humanity, the experience which it had cost so much blood and so many tears to acquire.

The work of analyzing these records for the double purpose just indicated was entrusted to the very same medical officers who have charge of the current work of the bureau to which I referred a little while ago. Even if no intention of publication had been entertained, these officers would have required for the efficient discharge of their duties, supposing them to have been limited to mere administrative ends, the use of a good consulting library; and if they had simply preserved for subsequent comparison the pathological specimens with which special medical and surgical reports were frequently accompanied, and without which these reports would often be only partially intelligible, an Army Medical Museum would have gradually been built up, however slow the process might have been.

At the time the war broke out nothing deserving the name of a Medical Library existed in Washington; and the incipient medical libraries in other cities, even at such great medical centres as Philadelphia, New York, and Boston, were exceedingly deficient in the very class of books

which were most frequently needed for consultation. Indeed, these medical libraries, built up by the voluntary contributions of a generous profession which numbers but few wealthy men in its ranks, were deficient in every direction, and, had the best of them been situated in Washington, it would but imperfectly have satisfied the necessities of the case. There was, therefore, no hope of supplying the want unless the Surgeon General's Office should be able to accumulate a library of its own. In like manner, the correct interpretation of many of the pathological specimens received implied the ability to compare them with others, such as ought to be found in a General Pathological Museum. But no considerable pathological museum existed in America. Small museums had indeed been created by the industry and liberality of the professors of several of the medical schools in the great northern cities, but these had been founded with special reference to the needs of the elementary instruction of medical students, and contained no wealth of accumulated material such as is often needed for purposes of comparison in arriving at the intelligent interpretation of an individual case. Such museums had been built up in the older civilized countries of Europe for the most part by Government aid, and without government aid it was and still is impossible that any considerable collection of the sort should ever grow up in America. It was evident, therefore, that if the officers on duty in the Surgeon General's Office were to enjoy the advantages of consulting such a collection, it must be created by the office itself. Now, here again, it was clear from the first that by a small additional expenditure beyond what would have been necessary to create such a library and museum as would be thoroughly efficient for the merely practical purposes of the Medical Bureau, a National Medical Library and a General Pathological Museum might be created, which would meet a want long felt by every medical man in America who has ventured into the domain of original research.

The considerations hitherto presented are, let me hope, sufficient to make it plain that it was the bounden duty of the Surgeon General's Office to undertake that scientific work of which enough has already been published to enable the medical profession throughout the world to form a judgment as to its character, and as to the fitness of the medical officers to whom it has been entrusted to accomplish the task which they have undertaken. The medical criticism of the Old World has already proclaimed its verdict as to both points in an outspoken manner, and I will not be deterred by any false modesty, on behalf of my colleagues or myself, from making the statement that the verdict has been altogether favorable. As for the medical profession of our own country, my fellow-citizens—so many of whom I see around me to-day—how

shall I find words to express my feelings? Your generous sympathy and encouragement has sustained us from the very first. Many of you served with us during the war, and aided in accumulating those vast stores of experience which we are now endeavoring to utilize. We were so fortunate as to secure your co-operation at the beginning, and your support has never failed us yet; I believe it never will, if we continue to deserve it. It is largely owing to your influence that the National Legislature has been induced to supply us with the funds, without which our work could not have been carried on; and however scanty these funds have appeared to some of us, when compared with the sums devoted by other civilized governments to similar purposes, we have never forgotten how liberal the appropriations have been when compared with any ever made before by our own National Government for any medical purpose. Not merely have you constantly strengthened our hands, and supported us in our endeavors to accomplish our work, but, ever since the close of the war, you have labored with the National Legislature to secure for the officers of the medical staff a reasonable share of rank and pay, and these efforts were at last, during the recent session of Congress, successful in securing legislation which, if it did not do for us all you had hoped, at least placed us on a better footing than we had ever hitherto enjoyed. It is, therefore, altogether an appropriate thing that I should explain, as I am now doing in your presence, the character of the work we are endeavoring to perform.

I have now to present to you, as briefly as possible, some details with regard to the nature and extent of the scientific work of which I have been speaking: but first, let me remark that the observations and reports which form the basis of this work are due to the intelligence and industry of the whole Medical Staff. This fact must never be lost sight of in estimating the character and importance of the work. It represents no mere individual observations and opinions, but the conjoined and systematic labor of a considerable body of trained and trustworthy medical men. The officers entrusted with the labor of digesting these observations, and preparing them for the press, have constantly endeavored, in all their publications, to give full credit to their brother officers at the various military posts, whose original labors are the foundation of all the scientific work that has been done, and of all that can be done at the Surgeon General's Office. I refer you confidently to any of our publications in illustration of this statement. This work of the officers of the Medical Staff deserves the appreciative recognition of all who are interested in the progress of Medical Science. Not merely have they made with alacrity the observations and reports required of them in the discharge of their military duties, but their voluntary labors have been

meritorious and important. Those of you who practise medicine in cities, and enjoy all the stimulus of converse with intelligent fellow-laborers and of competition for success, can hardly realize the difficulties under which most of the work of these medical officers is done, at remote and usually isolated stations, or amidst the hardships and perils of campaigns in the wilderness against the Indians, with no special stimulus to investigation except the love of science and desire for usefulness.

Next, I have to remind you that the work of analyzing these observations, comparing them with each other and with similar observations in other lands, preparing the results of these studies for publication, and seeing them through the press, has been from the beginning to the present time, with the exception of two or three publications, to which I will refer specifically hereafter, performed by but three medical officers; and it may be of interest to those who love to see economy in administration above all other things, for me to state that these three officers have received as remuneration for their labors during the last ten years nothing more than the modest emoluments belonging to the rank of Assistant Surgeons in the Army. One of them was, it is true, promoted to the grade of Surgeon a few months ago, but this was simply the accidental consequence of his place on the Army Register; the others remain as before. The three officers to whom I refer are my colleagues, Drs. Billings and Otis, and myself.

Now, it would not be just to these officers if I did not state that they have never been, and are not now, free to devote their whole time to the scientific work entrusted to their care—each is also charged with certain administrative duties which demand a portion of his time and attention.

Thus, my colleague, Dr. Billings, besides the charge of the Library and various special studies connected especially with the sanitary condition of barracks and hospitals, has always had to do a good deal of administrative work in connection especially with the purveying of medical supplies and the accountability of medical officers for supplies issued to them.

My colleague, Dr. Otis, besides his duties as Curator of the Army Medical Museum, as the officer in charge of its Surgical, Anatomical, and Miscellaneous sections, and as the officer entrusted with the preparation of the Surgical History of the Civil War, has had administrative work to do in the way of furnishing information from the Surgical records with regard to the numerous applications for artificial limbs and prothetic apparatus, and other current work connected with the Division of Surgical Records.

For myself, besides the charge of the Medical, Comparative Anatomy, and Microscopical sections of the Museum, the Chemical Laboratory of

the Surgeon General's Office, and the preparation of the Medical History of the Civil War, I have had charge, since its organization, of the Record and Pension Division of the Surgeon General's Office, a purely administrative bureau, which for several years employed about one hundred clerks, and which still has thrust upon it ample work to employ the same number, although parsimony in legislation has reduced the force to less than half, so that the work is rapidly falling behindhand. Some notion of the responsibility attaching to this bureau can be formed when I state that, since 1865, the hospital histories of about three hundred thousand deceased or disabled soldiers have been traced through the record books and furnished to accounting officers of the Government, especially to the Commissioner of Pensions, and the insufficiency of the clerical force now authorized will be appreciated, when I state that between twelve and thirteen thousand such applications are lying unanswered on the table of my chief clerk as I speak these words.

Now, you will readily understand that the administrative duties to which I refer must not merely increase the responsibilities, but must necessarily occupy a portion of the time of the officers concerned, with the inevitable effect of diminishing the amount of scientific work which it is possible for them to perform. Yet my experience in the office has convinced me that it would not be wise to relieve these officers of this administrative responsibility and throw it upon a different set of officers. The same records are to be used both for administrative and scientific purposes, and the double work can be best performed under the same heads. The most economical, and at the same time the most efficient means of diminishing the burdens of these officers, and of increasing both the quantity and the value of the scientific work which it is possible for them to perform, would be to provide them with a really adequate clerical force, and with a sufficient number of competent assistants. I do not speak to-night in any complaining spirit, but it would be worse than useless to pretend that adequate clerical and other assistance has ever been supplied to us. This is a naked fact, which it is my duty to make known, and which you must constantly bear in mind in appreciating the amount of work which we have as yet published. That under the circumstances we should have been able to do as much as we have—that since the close of the war we should have been able to prepare for publication the various works with which you are acquainted—the publications of the Surgeon General's Office, edited by us and already issued, constituting over six thousand quarto pages*—could only have been achieved by tireless industry and a genuine devotion to our task.

* See Appendix.

Coming next to the details of this scientific work, I may remark, that a portion of the reports received at the Surgeon General's Office which are susceptible of scientific treatment, refer to the conditions under which the soldier lives. Here belong the meteorological reports and a large portion of the annual sanitary reports.

Prior to the civil war, the meteorological observations made by the medical officers of the army were published from time to time by the Surgeon General's Office, the greater portion having been edited by the lamented Coolidge. All students of the Climatology of the United States are familiar with these works, which long furnished the only reliable information with regard to the climate of our western territories, and, indeed, contain information with regard to many districts which is still the only information printed.

During the civil war the fierce necessities of the struggle caused the suspension of these observations, but they were resumed after its close, and, at the present time, observations of the temperature three times a day, the rain-fall, appearance of sky, and direction and force of the winds, are recorded under the direction of the medical officer of every permanent military post, and barometrical, and other special observations, at selected posts. Since the Signal Service has been conducting its extensive meteorological observations in the more settled portions of the country, however, it has been thought by the Surgeon General that the interests of science, as well as of economy, would be best subserved if he should discontinue the publication of the meteorological observations made by the medical officers of the army, and accordingly an arrangement has been made by which the monthly means and other portions of the meteorological reports needed for reference in the Surgeon General's Office are briefed in convenient books, and the original reports are then turned over to the Signal Office, for use in conjunction with the observations made under the supervision of that bureau.

The annual sanitary reports received from the several military posts, since the close of the war, have served as the basis for the preparation by my colleague, Dr. Billings, of two bulky volumes, which contain descriptions of the several military posts, their barracks and hospitals, embracing a good deal of new information with regard to the medical topography of many parts of our country, especially the western territories, and also containing abstracts, prepared under my own supervision, of the sickness and mortality, and of the meteorological conditions, of the various posts for several years.

Another portion of the reports contains information with regard to the physical characteristics of the men who become soldiers; I refer to the monthly reports of the officers entrusted with the physical exam-

ination of recruits. These reports contain the name, nativity, former occupation, age, social condition, height, weight, chest measurement, complexion, and color of eyes and hair of each recruit examined, and in the case of rejected recruits, the nature of the disability on account of which enlistment is refused. These reports, if subjected to scientific treatment at stated intervals, say every five or ten years, would give valuable hints as to the improvement, deterioration, or stability of the physical characteristics of our population. I know that a very great number of these recruits are of foreign birth, but, as this is carefully specified in each case recorded, there would be no difficulty in the way of the separate analysis of the facts with regard to the native born, and the total number of observations which have accumulated since the war is large enough to be of considerable importance. The two splendid volumes recently published by Colonel J. H. Baxter, U. S. A., recently Chief Medical Officer of the Provost Marshal General's Bureau, and now Chief Medical Purveyor of the Army, contain an analysis of a vast number of similar facts observed by the examining surgeons in the course of the several drafts made during the civil war. I am clearly of the opinion that the analysis of the subsequent observations would possess sufficient scientific value to warrant the comparatively small amount of labor and expense requisite to do the work and publish it; but I regret to say that the office has not yet been able to secure enough clerical aid to assign the necessary force to this work, and nothing has as yet been done in this direction. I must hope that it may be possible in the near future to undertake the analysis of the reports received during the last ten years.

Still another portion of the reports received contains information with regard to the diseases and injuries from which our soldiers suffer while in actual service. Here belong the monthly reports of sick and wounded, the special reports of cases, the reports relating to epidemic diseases, and the various reports of wounds and surgical operations.

The monthly reports of sick and wounded are analyzed and consolidated by districts as soon after their reception as possible, and constantly furnish information as to the actual condition of the health of the army. From the statistical tables produced by their consolidation the brief statements made by the Surgeon General in his annual reports are prepared. They have also furnished the data for the abstracts published in the volumes prepared by Dr. Billings, mentioned a few moments ago.

With these exceptions, these valuable statistical tables remain unpublished. I am decidedly of the opinion that they contain a great deal of information much too useful to be lost. Indeed, I think, if the Surgeon General's Office could obtain the necessary force of clerks and assistants

to make an annual publication of these reports, accompanied by the accounts of interesting medical and surgical cases received during each year, it would be an important contribution to medical science; but with the means at our disposal, and the other demands made upon us, this has been hitherto quite out of our power. The special reports upon epidemics have, however, been utilized to some extent in the publication of two works prepared by myself, on the Epidemic Cholera and Yellow Fever in the Army during the years 1866 and 1867, and my colleague, Dr. Otis, has prepared a large volume, published in 1871, containing a report of 732 surgical cases treated in the Army from the close of the war to the date of publication. Thus the material in question has at least been partially utilized, but I think that the portion which as yet remains unpublished fully equals in value, and certainly exceeds in quantity, that which has thus far been printed. In connection with the subject of epidemic diseases, just alluded to, I ought also here to mention the investigation of the Epidemic Cholera which in 1873 afflicted the civil population of the United States. By an act of Congress the Surgeon General was directed to detail a medical officer of the army for this investigation, and Assistant Surgeon (now Surgeon) Ely McClellan, U. S. Army, was designated for this purpose. This officer made an elaborate report, which was published as a Congressional document. With it was printed a bibliography of cholera, prepared at the Surgeon General's Office by Dr. Billings, which is, I believe, the most complete list of the works on this subject that has yet appeared.

Perhaps it would be most convenient, in this connection, to say a few words with regard to the Chemical Laboratory of the Surgeon General's Office. The creation of this Laboratory was one of the necessities of the civil war. Immense purchases of medical supplies were being made, and it very frequently happened that efforts of the most ingenious kind were employed to defraud the Government. Moreover, among the great number of medical officers in service, there were many who were inexperienced, and some who were ignorant, and complaints were often made as to the quality of the medical supplies issued which were not justified by the facts. Under these circumstances it was constantly necessary that the Surgeon General should have the opinion of a chemical expert on whose advice he could rely, and it was this that led to the organization of the Chemical Laboratory. Soon other bureaus, especially the Subsistence department, began to apply to the Surgeon General for advice in the matter of supplies purchased or about to be purchased, and it is safe to affirm that the Laboratory of the Surgeon General's Office was the means of saving hundreds of thousand of dollars to the Government. The Laboratory was established on the most

economical basis, its personnel never having exceeded two individuals, a chemist and an assistant, both employed as acting assistant surgeons. Their time has been almost exclusively occupied in the examination of supplies about to be purchased for the army, or of supplies already purchased, with regard to which complaints had been made. If this Laboratory could be more liberally provided for, it might have a much wider field of usefulness. Scientific questions of a chemical character constantly arise in connection with the medical service of the Army, which might then profitably be investigated.

I have next to present a few remarks with regard to the Medical and Surgical History of the late Civil War. The project of such a work was conceived early during the struggle, suggested, no doubt, by the volumes published by the British Government on the Medical and Surgical History of the War in the Crimea. As early as June 9, 1862, the intention to prepare such a work was announced to the Medical Staff by a circular from the Surgeon General's Office, and all medical officers were requested to co-operate in the undertaking by collecting details of cases, and other material for the work. The supervision of the work of collecting surgical material was assigned, by the same circular, to Dr. J. H. Brinton, at that time Surgeon U. S. Volunteers; that of collecting medical material was assigned to me. Dr. Brinton was relieved from this duty in October, 1864, and his place supplied by my present colleague, Assistant Surgeon Otis, U. S. Army, then Surgeon U. S. Volunteers, who, for the three years previous, had served continuously in the field as Surgeon of the 27th Mass. Regiment of Infantry. Both my colleagues and myself did our best to collect material for the work in view, and our efforts were constantly sustained and encouraged by the Surgeon General.

In November, 1865, the Surgeon General issued a document, now well known as Circular No. 6, which was accompanied by two somewhat detailed reports, prepared by Dr. Otis and myself, "On the extent and nature of the materials available for the preparation of a Medical and Surgical History of the Rebellion." The object of this circular was to acquaint the medical profession with the character of the materials collected, and to secure, if possible, favorable public opinion in behalf of the legislation necessary to provide means for preparing the work and completing its publication. This merely preliminary document was widely circulated, and effected the end for which it was designed, Congress, in July, 1866, making an appropriation for the preparation of plates and illustrations for "A first part of the Medical and Surgical History of the Rebellion;" but it was not until March 3, 1869, that

Congress at length authorized the actual printing of five thousand copies of the first part of the work.

Meanwhile, anxious that the information collected on some of the more important surgical points should be made public, the Surgeon General published, in 1867 and 1869, two important monographs prepared by Dr. Otis: the first on Amputations at the Hip joint, the second on Excisions of the head of the Femur for shot injury.

The labor of preparing the first part of the Medical and Surgical History for publication had now so far advanced that it went to press soon after the necessary authority was obtained, and in December, 1872, the first part of the Medical and Surgical History was issued from the Government Printing Office. This part consisted of a medical volume, a surgical volume, and an appendix, the whole occupying 1800 pages quarto. The Medical volume, edited by myself, was devoted to the medical statistics of the war. Some necessary explanatory remarks were offered in the introduction to this volume, but detailed comments on the statistics were reserved for the second part of the work. The appendix consisted of the reports of the Medical Directors of armies and departments, and of other medical officers, which were believed to be of historical value. The Surgical volume, edited by Dr. Otis, contained a chronological summary of losses in battles and engagements, and a detailed discussion of the statistics and reports relating to special wounds and injuries of the head, face, neck, spine, and chest.

It was not until June, 1872, that legislation was obtained for continuing the publication of the work. Congress then passed an act for its completion and publication in two parts of eighteen hundred pages each, in addition to the parts already published.

In accordance with this legislation the publication of the second part of the work was commenced, and the Surgical volume of my colleague, treating of special wounds and injuries of the abdomen, the pelvis, the back, and the upper extremities, has, as you know, been brought successfully to its completion, and was issued from the Government Printing Office during the present summer. This volume contains 1024 pages quarto. I had hoped that its companion Medical volume, which will embrace a discussion of the symptoms, pathology, and treatment of those diseases which were the chief causes of the sickness and mortality among our soldiers during the war, would have appeared simultaneously. In this hope I was doomed to disappointment. In the winter of 1873 and '74 my health unexpectedly gave way, and for several months I was incapacitated for any literary work. For a long time subsequently, I was obliged, in accordance with the counsel of my medical advisers, to limit my hours of labor to a minimum, so that, with all my other duties,

I made during the two years which followed my first illness but little progress on the Medical History. I am thankful to say, however, that my health appears at length fully restored, and I trust, when my labors in connection with the Centennial come to a close, that I will be able to resume the printing of the volume and to bring it to a conclusion in a reasonable time.

The third part of the History is expected to consist, like the others, of two volumes. The Surgical volume will treat of the wounds and injuries of the lower extremities; of luxations and fractures from other causes than gunshot; of burns, scalds and frost-bites; of generalities on gunshot wounds, amputations, &c.: of the use of anæsthetics: of the *materia chirurgica*, and of the transportation of the wounded. The Medical volume will treat of the hospital system inaugurated during the war, the system of medical supplies, and other kindred matters.

Before passing to another topic, I desire to say a word with regard to the work of my colleague, Dr. Otis, on the Surgical History. How painstaking and accurate it has been, how laboriously he has collected the former experience of other lands to throw light on our own and to aid in its interpretation, is well known to all of you who have looked into his volumes. But I wish to remind you, in connection with the statements I have made, as to the time required for the preparation of this work, of the extent of the data to be handled as compared with those of any former war. The previous surgical histories of wars, published under government auspices, were that prepared by Dr. T. P. Matthew on the Surgery of the English Army in the Crimean War, and those of M. Chenu on the Surgery of the French Army in the Crimea, and during the Italian War. Dr. Matthew had to deal with 12,166 surgical cases: Chenu with 40,586 for the Crimean, and 19,590 for the Italian war. The reporter for the American war had to deal with the reports of over 270,000 cases of wounds. Moreover, my colleague undertook a task comparatively new in military surgery, which certainly appears to me of the greatest importance. In the British and French reports, when a wounded man was invalided or pensioned his history was terminated. Dr. Otis attempted to trace all the more important cases down to the date of publication, and this the organization of the Pension Bureau enabled him to do successfully in the majority of instances. At the time this plan was determined upon, it was believed to be altogether new. It is now known, however, that Professor Hannover, of Copenhagen, had conceived a similar plan, and applied it in the case of the invalids of the war of 1864.

Similar investigations have since been made by Lœffler, Mossakowsky,

and Berthold, though in connection with a much smaller number of cases than occupied my colleague.

I cannot dwell longer to-night on the Medical and Surgical History of the War of the Rebellion. I pass to a few remarks concerning the Library of the Surgeon General's Office. I have already indicated the reasons for the commencement of this Library. The first appropriation of money for the purpose was made by Congress not long after the close of the war. For two or three years ten thousand dollars, subsequently, however, only five thousand, were appropriated annually. This has been expended with great economy and discretion, under the supervision of my colleague, Dr. Billings. A great many books have also been acquired by exchange, or have been presented to the library. As a result, this library now contains about 40,500 bound volumes and 41,000 pamphlets. Although, for obvious reasons, under the charge of the Surgeon General, this library is essentially the Medical Section of the Library of Congress. For several years the Librarian of Congress has not purchased medical books, leaving that branch of the subject to the Surgeon General's Office. In 1874, the Government Printing Office issued a small edition of a Catalogue of Authors, prepared by Dr. Billings, which formed three quarto volumes of about 2,000 pages, similar in style to the Catalogue of the Congressional Library. This Catalogue is in the possession of every public medical library in the country, and is very useful, as far as it goes, to students who desire to avail themselves of the resources of the library in connection with medical researches of any kind. The library itself is thrown open to all medical men who choose to use it.

Although far from complete, this library is now one of the great medical libraries of the world; and right here I wish to say, that even double the money expended upon it would not have made it as valuable as it now is but for the generous assistance of the profession of this country. Many of our physicians have ransacked their own libraries to supply us with works which, in many instances, we could not otherwise have obtained, especially the older American books and journals. The extent to which this has been done is the best proof of the general desire of the medical profession of the United States that this library should speedily become a complete library of reference on medical subjects.

I know that a few individuals have objected that Washington is not the best place for a great medical library, and seem to think it a pity that it cannot be established in Philadelphia or New York, where the number of physicians is so much larger; but the usefulness of such a library is not to be measured by the number of casual readers, but by the number of original investigators who consult it in connection with their own work. It is only through the work of these men that a great library becomes

generally useful to the whole profession. These original investigators are comparatively few in any city, but almost every city has some of them. Wherever the National Medical Library might be, the majority of the medical investigators of the country would have to travel to consult it. Until very lately, such men had to travel to Europe for the same purpose. It is important that this should no longer be necessary. It is important that there should be in at least one place in our country a complete medical library, and this we will make at the Surgeon-General's Office, if we can get the means. There is no probability that such a library will ever be built up in the United States except by Government aid. This is also what has happened in all other countries. If we could secure for the purposes of the library exclusively an annual appropriation of ten thousand dollars, we could in a very few years make this library the most complete in the world.

One point further I desire to mention. To give the library already collected the highest degree of usefulness, a subject catalogue is now imperatively demanded. Dr. Billings has undertaken such a work. With dauntless industry he has not merely arranged the cards representing the separate treatises in the library according to their subjects, but he has undertaken to make separate cards for all the original essays contained in all the medical periodicals in the library. About 275,000 such cards have already been prepared. He now desires to obtain the authority to have the Government Printing Office publish a Subject Catalogue prepared from these cards. A specimen fasciculus of this catalogue has already been issued, and most of you who are specially interested in medical bibliography have already seen it. Dr. Billings estimates that the catalogue, if completed on the plan of this fasciculus, would make about five volumes of a thousand pages each. He is abundantly willing to undertake the labor if Congress can be induced to authorize the printing of the work. An appeal will be made to Congress on this subject at its next session, and if the medical profession of the country agree with me, that the publication of such a catalogue would be a work useful to every medical investigator in the land, I feel sure that by an expression of their views they can secure the success of the undertaking.

Lastly, I have to say a few words with regard to the Army Medical Museum. I have already indicated the circumstances under which it originated. It has now acquired very considerable extent, containing very nearly 19,000 specimens. The specimens collected during the civil war were almost all illustrations of military surgery and of camp diseases. But, since the war, it has begun to acquire a broader scope, and we now aim to make it a National Medical Museum. The collection now embraces, besides the Medical and Surgical sections, a Microscopical section,

sections of Human and Comparative Anatomy, and a Miscellaneous section.

The section of Comparative Anatomy is yet in its infancy, and almost all the specimens have been collected by medical officers of the army, so that it has cost altogether but a few hundred dollars. There are about 1500 skeletons and crania, almost all of American vertebrates, in this section. A check list of them, prepared by Dr. H. C. Yarrow, has recently been published in pamphlet form. Those interested in this special subject can obtain copies of it at the Hospital of the Medical Department of the Army at the Centennial grounds.

The section of Human Anatomy is chiefly remarkable for its collection of human crania, which now number about 1600. These chiefly represent the native American races, including the prehistoric mound-builders, and the various modern tribes, from the Esquimaux at the North to the Patagonians at the southern extremity of South America. The careful measurement of these crania, under the supervision of Dr. Otis, constitutes a genuine addition to the science of ethnology. An abstract of these measurements has been prepared by him, and recently published in pamphlet form. Ethnologists can obtain copies at our hospital on the Centennial grounds, or of the Surgeon General.

Catalogues of the Medical, Surgical, and Microscopical sections were published in 1867. That of the Surgical section was prepared by Assistant Surgeon A. A. Woodhull; that of the Medical section by myself; and that of the Microscopical section by Assistant Surgeon E. Curtis. Since these catalogues were published the collections have doubled in size. The publication of a catalogue of the additional specimens, or a revised catalogue of the whole, would be a useful work.

It gives me pleasure to state that the interest taken in this collection by the medical profession of the country is being annually more and more frequently displayed by the presentation of valuable medical and surgical specimens from all parts of the country. Such specimens are always acceptable, and especially, I may remark, that those which have served as the basis of original communications published in the medical journals have especial interest. You can all appreciate how useful it would be; how many misunderstandings would have been prevented if the actual specimens which have served for certain pathological descriptions could have been somewhere preserved and accessible to the criticism of subsequent investigation. But no medical museum that is not national in its character will ever serve as the central point for such a collection.

The actual appropriations of money for our Museum have never ex-

ceeded five thousand dollars a year. The sum is not a liberal one, and much more could be advantageously expended if it could be obtained.

The Centennial Medical Commission, in giving the invitation to which I have responded to-night, expressed the wish that I would endeavor to represent to your eyes in some way the character of some portion of our collection. In compliance with their request, I have naturally selected my illustrations from the Medical and Microscopical sections, which are under my own immediate direction. I have made use of photography for the purpose, and Mr. Edgerton, of J. W. Queen & Co., 924 Chestnut street, has kindly undertaken to exhibit the pictures on the screen. First, I exhibit a series of photographs, novel, I think, in character, representing certain pathological conditions of the intestinal canal.

[The lecturer here exhibited 25 lantern slides, representing pathological alterations of the intestinal mucous membrane, and briefly commented on each.]

My other illustrations are taken from the Microscopical section. This section was originally established for the purpose of preserving the specimens acquired in the study of the pathological anatomy of some of the diseases of soldiers. Sections of morbid growths, and other specimens sent to the Surgeon General's Office by the medical officers of the Army for an opinion as to their nature, have been added, with a certain number of other specimens, especially in the direction of normal and pathological histology. The collection now contains about 7,000 permanently mounted microscopical slides. A single assistant, paid as a clerk of the 1st class, constitutes, under my direction, the whole personnel available for the work.

The process by which the photographs I am about to exhibit were prepared, was, as most of you are aware, brought to its present state of perfection by my own original investigations. A complete misconception exists in certain quarters as to the time I am able to devote to work of this class. It has been simply my amusement—my relaxation from the daily routine and toil of the other labors which I have outlined to you to-night. For years all the work of this kind I have been able to accomplish has been done on Sundays and holidays.

A part of this work was undertaken for the sake of the Medical History of the War.

[Here the lecturer showed 12 photo-micrographs exhibiting perpendicular sections of diseased intestines, the magnifying power with which the slides were taken ranging from 50 to 200 diameters. This was multiplied by 50 by the lantern projection.]

Another portion represents incidental histological work.

[Here 15 micro-photographs were shown, including 9 of blood corpuscles, to demonstrate the impossibility of discriminating between the blood of man and certain other mammals. These slides were taken with 150 to 1000 diameters.]

Still another portion represents work undertaken in connection with the investigation of attempts to defraud the Government.

[Here 14 slides, each magnified 150 diameters, were exhibited, illustrating an investigation into the so-called "calf-hair goods," undertaken at the request of the Honorable Secretary of the Treasury.]

In connection with these investigations, the question of the scientific certainty of microscopical appearances has constantly been thrust upon me, and I have been forced to the conclusion that not unfrequently, especially when high powers are used, the false appearances resulting from diffraction and interference have been mistaken for real structure. This would be a melancholy conclusion, were I unable to point out how such misinterpretations may be avoided. It is impossible to do this in detail on such an occasion as this, but I will show you a few pictures in illustration of my meaning.

[The lecture was concluded by the exhibition of a series of slides representing the real and spurious appearances of certain diatoms often employed by microscopists as test objects, the slides being magnified from 500 to 2500 diameters, and this increased by the lantern fifty times.]

NOTE.—The lecturer's descriptions of the several slides would require for their clear understanding the reproduction of the pictures referred to. At the request of the lecturer, these descriptions are therefore omitted.

APPENDIX.

Publications of the Surgeon General's Office.

1863-1876.

Circular No. 9. War Department, Surgeon General's Office, July 1, 1863. *Consolidated Statement of Gunshot Wounds.* By Surgeon J. H. BRINTON, U. S. Volunteers, 11 pp., 8vo.

Circular No. 15. War Department, Surgeon General's Office, Washington, September 8, 1863. *Sickness and Mortality of the Army during the first year of the War.* By J. J. WOODWARD, Assistant Surgeon, U. S. Army, pp. 8, 8vo, with 6 diagrams.

Circular No. 6. War Department, Surgeon General's Office, Washington, March 10, 1864. *Reflex Paralysis.* By Acting Assistant Surgeons S. WEIR MITCHELL, GEO. R. MOREHOUSE, and W. W. KEEN, Jr., pp. 17, 16mo.

Circular No. 1. War Department, Surgeon General's Office, Washington, June 10, 1868. *Report on Epidemic Cholera and Yellow Fever in the Army of the United States during the Year 1867.* By Brevet Lieutenant Colonel J. J. WOODWARD, Assistant Surgeon, U. S. Army, pp. 156, 4to.

Circular No. 2. War Department, Surgeon General's Office, Washington, January 2, 1869. *A Report on Excisions of the Head of the Femur for Gunshot Injury.* By Brevet Lieutenant Colonel G. A. OTIS, Assistant Surgeon, U. S. Army, pp. 141, 4to.

Circular No. 3. War Department, Surgeon General's Office, Washington, August 17, 1871. *A Report on Surgical Cases treated in the Army of the United States from 1865 to 1871.* By Brevet Lieutenant Colonel G. A. OTIS, Assistant Surgeon, U. S. Army, pp. 296, 4to.

Circular No. 4. War Department, Surgeon General's Office, Washington, December 5, 1870. *Report on Barracks and Hospitals, with Descriptions of Military Posts.* By Brevet Lieutenant Colonel J. S. BILLINGS, Assistant Surgeon, U. S. Army, pp. 494, 4to.

Circular No. 5. War Department, Surgeon General's Office, Washington, May 4, 1867. *Report on Epidemic Cholera in the Army of the United States during the Year 1866.* By Brevet Lieutenant Colonel J. J. WOODWARD, Assistant Surgeon, U. S. Army, pp. xviii, 65, 4to.

Circular No. 6. War Department, Surgeon General's Office, Washington, November 1, 1865. *Reports on the Extent and Nature of the Materials available for the preparation of a Medical and Surgical History of the Rebellion.* Medical Report by Brevet Major J. J. WOODWARD, Assistant Surgeon, U. S. Army; Surgical Report by Brevet Lieutenant Colonel G. A. OTIS, Surgeon, U. S. Volunteers, pp. 166, 4to.

Circular No. 7. War Department, Surgeon General's Office, Washington, July 1, 1867. *A Report on Amputations at the Hip-joint in Military Surgery.* By Brevet Lieutenant Colonel G. A. ORIS, Assistant Surgeon, U. S. Army, pp. 87, 4to.

Circular No. 8. War Department, Surgeon General's Office, Washington, May 1, 1875. *A Report on the Hygiene of the United States Army, with descriptions of Military Posts.* By Brevet Lieutenant Colonel J. S. BILLINGS, Assistant Surgeon, U. S. Army, pp. lix, 567, 4to.

Catalogue of the Surgical Section of the United States Army Medical Museum. Prepared, under the direction of the Surgeon General, by Brevet Major A. A. WOODHULL, Assistant Surgeon, U. S. Army. Washington: Government Printing Office, 1866, pp. 664, 4to.

Catalogue of the Medical Section of the United States Army Medical Museum. Prepared, under the direction of the Surgeon General, by Brevet Lieutenant Colonel J. J. WOODWARD, Assistant Surgeon, U. S. Army. Washington: Government Printing Office, 1867, pp. 136, 4to.

Catalogue of the Microscopical Section of the United States Army Medical Museum. Prepared, under the direction of the Surgeon General, by Brevet Major E. CURTIS, Assistant Surgeon, U. S. Army. Washington: Government Printing Office, 1867, pp. 161, 4to.

[For Catalogues of the section of Human and Comparative Anatomy, see Centennial pamphlets *infra*.]

Catalogue of the Library of the Surgeon General's Office. By Brevet Lieutenant Colonel J. S. BILLINGS, Assistant Surgeon, U. S. Army. Washington: Government Printing Office, 1872, pp. 454, 4to.

Catalogue of the Library of the Surgeon General's Office. By Brevet Lieutenant Colonel J. S. BILLINGS, Assistant Surgeon, U. S. Army. Vol. 1, A—L, pp. 1193, 4to. Vol. 2, M—Z, pp. 956, 4to. Supplement, pp. 319, 4to. Washington: Government Printing Office, 1873-4.

Specimen Fasciculus of a Catalogue of the National Medical Library under the direction of the Surgeon General of the U. S. Army, at Washington, D. C. By Brevet Lieutenant Colonel J. S. BILLINGS, Assistant Surgeon, U. S. Army. Washington: Government Printing Office, 1876, pp. 72, 4to.

A Medical Report upon the Uniform and Clothing of the Soldiers of the United States Army. By Brevet Major A. A. WOODHULL, Assistant Surgeon, U. S. Army. Washington: Surgeon General's Office, 1868, pp. 26, 8vo.

Report on the Pathological Anatomy and Histology of the Respiratory Organs in the Pleuro-pneumonia of Cattle, with 6 lithographs from photo-micrographs. Washington, June 15, 1870, by Brevet Lieutenant Colonel J. J. WOODWARD, Assistant Surgeon, U. S. Army, pp. 9, 4to. In the Report of the Commissioner of Agriculture on the Diseases of Cattle in the United States. Government Printing Office, 1871.

Report of Results of Examinations of Fluids of Diseased Cattle, with reference to the presence of Cryptogamic Growths. By Brevet Lieutenant Colonel J. S. BILLINGS, Assistant Surgeon, U. S. Army, and Brevet Major E. CURTIS, Assistant Surgeon, U. S. Army, pp. 12, 4to. In the Report of the Commissioner of Agriculture on the Diseases of Cattle in the United States. Government Printing Office, 1871.

Photographs of Surgical Cases and Specimens, taken at the Army Medical Museum, with histories of 296 cases. By Brevet Lieutenant Colonel G. A. OTIS, Assistant Surgeon, U. S. Army. Washington, 1866-71. 6 vols., 4to.

Reports accompanied by Photographs of Microscopic objects, by Brevet Lieutenant Colonel J. J. WOODWARD, Assistant Surgeon, U. S. Army, viz :

Report on the Magnesium and Electric Lights as applied to Photo-Micrography, 6 pp., 4to, 11 photographs. Surgeon General's Office, 1870.

Report on the Oxy-calcium Light as applied to Photo-Micrography. 3 pp., 4to, 2 photographs. Surgeon General's Office, 1870.

Report on an improved method of photographing Histological Preparations by Sun-light. 10 pp., 4to, 11 photographs. Surgeon General's Office, 1871.

Report on the Histology of Minute Blood-vessels. 8 pp., 4to, 11 photographs. Surgeon General's Office, 1870.

Report on the Minute Anatomy of two cases of Cancer. 10 pp., 4to, 2 photo-lithographs. Surgeon General's Office, 1872.

Memorandum on Pleurosigma Angulatum and Pleurosigma Formosum. 4 pp., 4to, 8 photographs. Surgeon General's Office, 1871.

Memorandum on Surirella Gemma. 1 p., 4to, 2 photographs. Surgeon General's Office, 1871.

Memorandum on the Test Podura. 3 pp., 4to, 5 photographs. Surgeon General's Office, 1871.

Memorandum on Amphipleura Pellucida. 1 p., 4to, 2 photographs. Surgeon General's Office, 1871.

Memorandum on the Nineteen-band Test Plate of Nobert. 4 pp., 4to, 9 photographs. Surgeon General's Office, 1872.

Four Letters to the Surgeon General, accompanying photographs of the Mosquito, certain Parasites, the Proboscides of certain Flies, and miscellaneous photographs of Insects and parts of Insects. 8 pp., 4to, 35 photographs. Surgeon General's Office, 1872.

The Medical Department of the United States Army from 1775 to 1873. By Brevet Major H. E. BROWN, Assistant Surgeon, U. S. Army. Washington: Surgeon General's Office, 1873.

THE MEDICAL AND SURGICAL HISTORY OF THE WAR OF THE REBELLION, 1861-65. Prepared under the direction of the Surgeon General. Part I, Vol. I, *Medical History*, by Brevet Lieutenant Colonel J. J. WOODWARD, Assistant Surgeon, U. S. Army, pp. xliii, 726: Vol. II, *Surgical History*, by Brevet Lieutenant Colonel G. A. OTIS, Assistant Surgeon, U. S. Army, pp. clv, 650. *Appendix*, containing Reports of Medical Directors, &c., pp. 365. Washington: Government Printing Office, 1870. [Actually issued in December, 1872.] Part II, Vol. II, *Surgical History*, by Brevet Lieutenant Colonel G. A. OTIS, Assistant Surgeon, U. S. Army, pp. 1024. Washington: Government Printing Office, 1876.

A Report on a Plan for Transporting Wounded Soldiers by Railway, &c. By Brevet Lieutenant Colonel G. A. OTIS, Assistant Surgeon, U. S. Army. Surgeon General's Office, 1875, 56 pp., 8vo.

Pamphlets issued in connection with the exhibit in the Hospital of the Medical Department, U. S. Army, International Exhibition of 1876, viz:

No. 1. *List of Skeletons and Crania in the Section of Comparative Anatomy of the U. S. Army Medical Museum*, for use during the International Exhibition of 1876. By Dr. H. C. YARROW. Washington, 1876, pp. 52, 8vo.

No. 2. *Description of the Models of Hospital Cars*. By Brevet Lieutenant Colonel J. J. WOODWARD, Assistant Surgeon, U. S. Army, 10 pp., 8vo.

No. 3. *Description of the Models of Hospitals*. By Brevet Lieutenant Colonel J. J. WOODWARD, Assistant Surgeon, U. S. Army, 22 pp., 8vo.

No. 4. *Description of the Models of Hospital Steam-Vessels*. By Brevet Lieutenant Colonel J. J. WOODWARD, Assistant Surgeon, U. S. Army, 12 pp., 8vo.

No. 5. *Description of Perot & Co's Improved Medicine Wagon*. By the manufacturer, 16 pp., 8vo.

No. 6. *Description of the U. S. Army Medicine Transport Cart, Model of 1876*. By Brevet Lieutenant Colonels D. L. HUNTINGTON and G. A. OTIS, Assistant Surgeons, U. S. Army, 16 pp., 8vo.

No. 7. *Description of Selected Specimens from the Surgical Section of the Army Medical Museum*. By Brevet Lieutenant Colonel G. A. OTIS, Assistant Surgeon, U. S. Army, 22 pp., 8vo.

No. 8. *Check List of Preparations and Objects in the Section of Human Anatomy of the U. S. Army Medical Museum*, for use during the International Exhibition of 1876. By Brevet Lieutenant Colonel G. A. OTIS, Assistant Surgeon, U. S. Army. Washington, 1876, pp. 135, 8vo.

No. 9. *List of Selected Microscopical Preparations from the Army Medical Museum*. By Brevet Lieutenant Colonel J. J. WOODWARD, Assistant Surgeon, U. S. Army, 7 pp. 8vo.

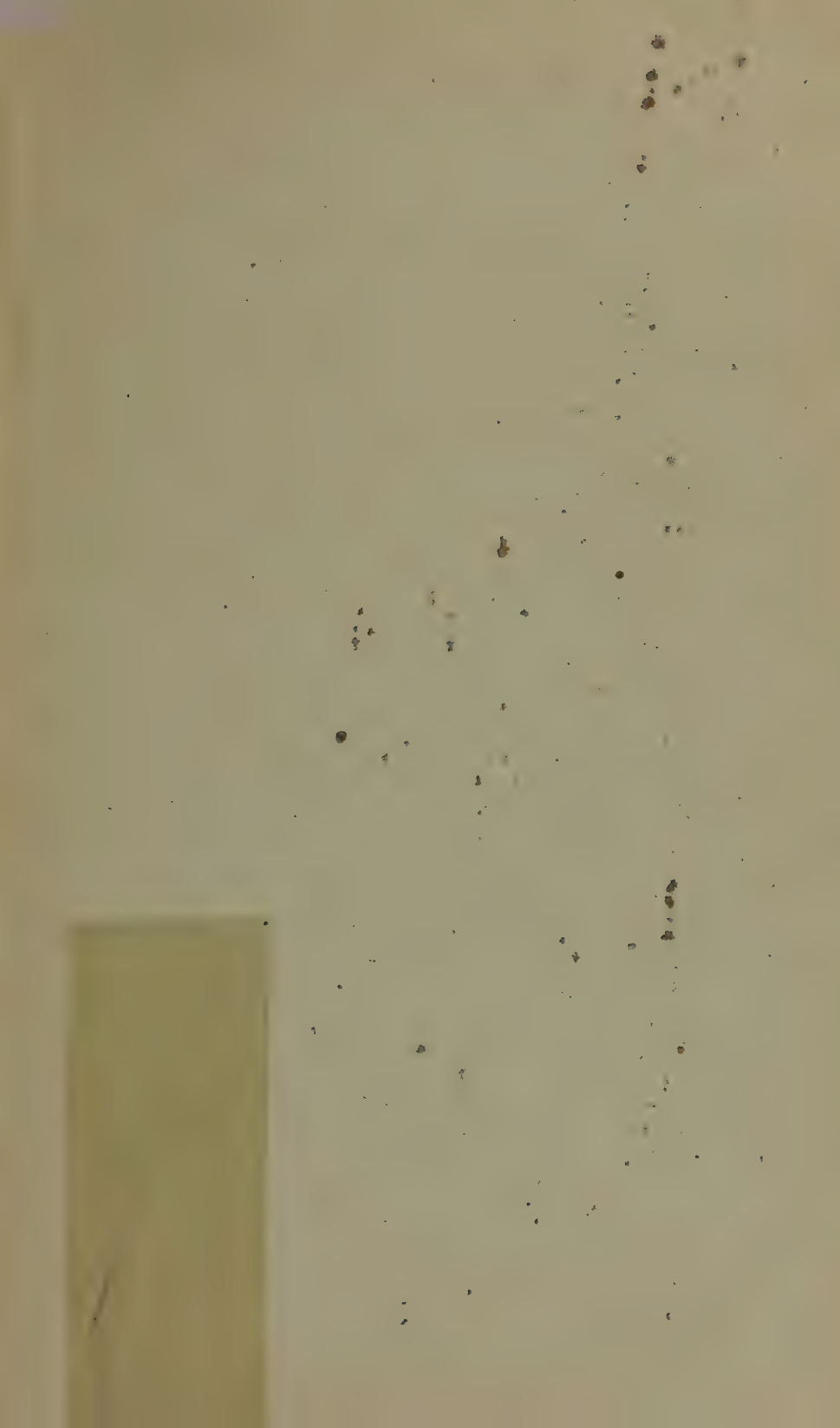
No. 10. *Description of Selected Specimens from the Medical Section of the Army Medical Museum*. By Brevet Lieutenant Colonel J. J. WOODWARD, Assistant Surgeon, U. S. Army, 21 pp., 8vo.

No. 11. *Typho-Malarial Fever: Is it a Special Type of Fever?* Being remarks introductory to the discussion of the question in the Section of Medicine, International Medical Congress. By Brevet Lieutenant Colonel J. J. WOODWARD, Assistant Surgeon, U. S. Army, 44 pp., 8vo.

Other Official Publications of the Medical Staff.

Cholera Epidemic of 1873 in the United States. Reports prepared under the direction of the Surgeon General of the Army. A. *History of the Cholera Epidemic of 1873 in the United States*. By Brevet Major E. McCLELLAN, Assistant Surgeon, U. S. Army, 513 pp., 8vo. B. *History of the Travels of Asiatic Cholera*. By JOHN C. PETERS, M. D., of New York, and Brevet Major E. McCLELLAN, Assistant Surgeon, U. S. Army, 192 pp., 8vo. C. *Bibliography of Cholera*. By Brevet Lieutenant Colonel J. S. BILLINGS, Assistant Surgeon, U. S. Army, 320 pp., 8vo. Washington: Government Printing Office, 1875, 43d Congress, 2d Session, House of Representatives, Executive Document No. 95.

Statistics, Medical and Anthropological, of the Provost Marshal General's Bureau, &c. By Colonel J. H. BAXTER, Chief Medical Purveyor, U. S. Army. Washington: Government Printing Office, 1875, Vol. I, pp. lxii, 568; Vol. II, pp. xxviii, 767.









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